A5 concluded

3 and 4 mounted in a microchannel 21. Signal processing and excitation integrated circuits 61 and 62 are mounted in the surface of the wafer 26 and connected along the surface of the wafer to the cMUTs rather than through vias.

REMARKS

This amendment is being made to correct errors in the specification discovered while preparing the formal drawings. The changes bring the specification into line with the drawings and do not make any material changes to the specification.

It is respectfully requested that this amendment be entered.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

The Commissioner is hereby authorized to charge any fees determined to be due in connection with this communication to our Deposit Account No. 06-1300 (Order No. A-69570/AJT).

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Respectfully submitted,

Maria Swiatek

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the paragraph beginning on page 3, line 16, as follows:

Figure 2 is a plan view of a cMUT array with [five] <u>twenty-five</u> cells.

Please amend the paragraph beginning on page 3, line 20 as follows:

Figure 4 is a sectional view of the channel of Figure [2] <u>3</u> taken along the line [3-3] <u>4-4</u>.

Please amend the paragraph beginning on page 6, line 14 as follows:

Since the dimensions of individual membranes forming the cMUTs are much smaller than the wavelength of the sound waves in the fluid, cMUTs generate significant evanescent fields in the fluid. In addition, at the edges, where the membranes are connected to the substrate, the motion of the cMUT membrane is coupled to the substrate. This combination results in an efficient excitation of propagating Stoneley waves at the fluid/substrate interface as shown in Fig. [6] <u>7</u>. Stoneley waves have an elliptical particle velocity field in the fluid that decays along the thickness of the channel. Hence, it is possible to move the fluid along the shallow channel by the traveling Stoneley waves which effectively turn the bottom surface of the channel into a distributed pump.

Please amend the paragraph beginning on page 6, line 24, as follows:

One can selectively excite Stoneley waves 36 while not coupling into the bulk waves in the channel by fabricating interdigitated cMUTs [32] <u>37</u> on the wall of the fluidic channel as shown in Fig. 7. The mode selectivity is achieved by matching the spatial period of the cMUTs to the wavelength of the desired propagation mode. By applying in and out of phase signals to consecutive fingers, bulk wave radiation to the fluid can be avoided. By employing three spaced fingers or electrodes and applying 120° phase shifted signals, unidirectional fluid flow can be obtained. The traveling acoustic field in the channel has elliptical particle displacement fields that decay in the distance of $\lambda/2\pi$ from the excitation transducer surface, where λ is the

wavelength of acoustic waves as shown in Fig. 7. For a water-like fluid, this will be around 24 μm for Stoneley waves at 100 MHz. Hence, this frequency would be suitable for a typical channel height of 30 μm. At lower frequencies, the Stoneley wave will also couple to the top surface of the channel to generate plane wave-like modes traveling along the length of the channel. These modes will be useful in determining the flow rate of the fluid.

Please amend the paragraph beginning on page 8, line 23, as follows:

As referred to above, the signal processing electronics can be connected to the cMUTs and carried on the surface of the wafer. Figures 12 and 13 show cMUTs 27 and 28 as in Figures 3 and 4 mounted in a microchannel 21. Signal processing and excitation integrated circuits 61 and 62 are mounted [on] in the surface of the wafer 26 and connected along the surface of the wafer to the cMUTs rather than through vias.